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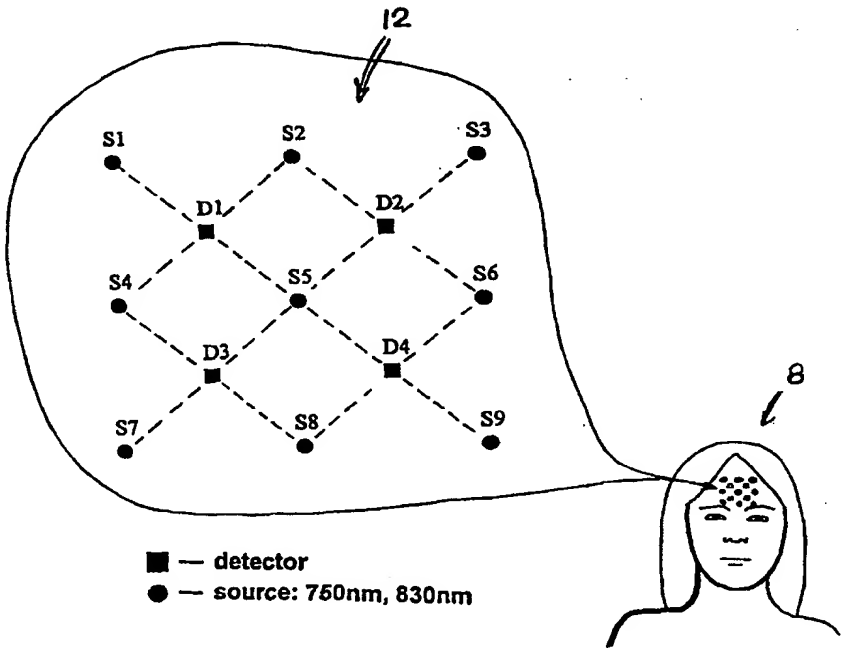
(54) Title: IMAGING AND CHARACTERIZATION OF BRAIN TISSUE

(57) Abstract

An optical examination technique employs an optical system (15, 45, 100, 150, 200, 260 or 300) for *in vivo* non-invasive transcranial examination of brain tissue of a subject. The optical system includes an optical module (12 or 14) arranged for placement on the exterior of the head, a controller and a processor. The optical module includes an array of optical input ports and optical detection ports located in a selected geometrical pattern to provide a multiplicity of photon migration paths inside the biological tissue. Each optical input port is constructed to introduce into the examined tissue visible or infrared light emitted from a light source. Each optical detection port is constructed to provide light from the tissue to a light detector. The controller is constructed and arranged to activate one or several light sources and light detectors so that the light detector detects light that has migrated over at least one of the photon migration paths. The processor receives signals corresponding to the detected light and forms at least two data sets, a first of said data sets representing blood volume in the examined tissue region and a second of said data sets representing blood oxygenation of the examined tissue. The processor is arranged to correlate the first and second data sets to detect abnormal tissue in the examined tissue.



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